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MUSHROOM FAIRY RINGS OF TRICHOLOMA PRAEMAGNUM

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During a number of seasons the author has been interested in a large mushroom that forms "fairy rings" in the dry grassland of open mountain parks. The rings were first noticed at Tolland, Colorado, near the mountain laboratory of the University of Colorado. Later they were seen at other points within a radius of 20 miles, namely: at Eldora, Sulphide, Nederland, Rollinsville, Pine Glade, Pactolus, Crescent and Plainview. All of these points lie between 6,000 and 9,000 feet in altitude.

The rings were first noticed and photographed in 1909 but the mushroom was not carefully examined until 1912, when it was recognized as a *Tricholoma*, although no specific determination could be made. On the appearance of Vol. 10, part 1, of the North American Flora* with Murrill's account of that part of the Agaricales to which *Tricholoma* belongs, the plant was identified for me by Dr. L. O. Overholts now of Pennsylvania State College, as *Tricholoma praemagnum* Murrill.† The type cited by the author of the species was "collected on the crumbling walls of an old sod house in Saskatchewan, Canada." The description also notes that specimens were "collected on high land under sagebrush, near Gunnison, Colorado." No mention is made of production of fairy rings or semicircles or crescents.

* North American Flora. Vol. 10, part 1, p. 12, 1914. The plant is described as *Melaneleuca praemagnum*. Murrill has also used the name *Tricholoma praemagnum* in *Mycologia*, 6: 269. 1914.

† Overholts, L. O. A re-description of *Tricholoma praemagnum* (in this issue of TORREYA).

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The diameter of the fairy rings produced by this mushroom depends, naturally, upon age. One of the smallest seen is shown in Fig. 1. It was 3.3 meters across. Growth is slow, as shown by observations at Tolland. One of the rings, Fig. 2, is cut about 1.5 meters from the periphery by a roadway across which the mycelium does not extend. Evidently this small part thus separated from the main portion of the ring must have been in existence when the road was first used. This is known to be



FIG. 1. Small Fairy Ring (3.3 m. in diameter) of *Tricholoma praemagnum*. The light-colored vegetation within the ring is the Mountain Sage, *Artemisia frigida*.

about 15 years ago. Hence the radial growth of this ring can not have averaged more than 1 dm. yearly. Since the part of the ring now separated off, matches very well the part on the other side of the road there is every reason to believe that it must have been more than a mere fragment at the time the road was first established. It would therefore appear that the growth of the ring is probably much less than 1 dm. per annum. Examination of

points staked out on other rings shows that in some seasons the rings advance only a few centimeters. Growth is much slower than reported by Dr. Bayliss* in England for fairy rings of *Marasmius oreades* and *Clitocybe gigantea*, where radial increase was from 6 to 12 inches annually. No doubt some of the rings produced by *Tricholoma praemagnum* are from one to two centuries old.



FIG. 2. Fairy Ring cut near one edge by a road. Knowing the age of the road the calculation is made that this ring does not increase radially more than 1 dm. a year. The light-colored vegetation in that part of the ring away from the road is *Artemisia frigida*.

The sporophores of the mushroom usually appear abundantly in August or early September following a period of rainy weather, but some may be found after rains in July or June or even May. In many seasons there are so few sporophores produced at any one time that no mushroom rings are apparent. Although, as

* Bayliss, Jessie D., Observations on *Marasmius oreades* and *Clitocybe gigantea* as Parasitic Fungi. *Journal of Economic Biology*, 6: part 4, pp. 111-132, 1911. (A reprint of this article was kindly loaned the writer by Professor George D. Fuller of the University of Chicago.)

noted later, the grasses and other vegetation indicate the presence of the mycelium in the soil as a ring-like or crescent-shaped growth. During eight seasons at the mountain laboratory four years (1909, 1912, 1913, 1914) showed excellent development of sporophores, with many fairy rings easily recognized by even the non-botanist. In each of these years there were heavy rains in August.

Although requiring wet weather for the production of sporophores, *Tricholoma praemagnum* is a distinct xerophyte, or is at least associated with xerophytic plants. It seems to occur only in dry grassland areas. This is strikingly shown in many places by the fairy rings on dry knollsides which are not complete toward the lower part of the slope where they seem unable to invade mesophytic grassland. Thus, instead of a ring, there is frequently produced a semicircle or a crescent with the points extending toward the area of moister soil.

The vegetation at the margin of the fairy rings is always somewhat different from that of the ordinary dry grassland. Usually there is a rather bare zone in which may develop mountain sage (*Artemisia frigida*), or chickweed (*Cerastium occidentale*), or other plants. Figs. 1 and 2 illustrate these facts. The limits of these fairy rings can usually be recognized at all times during the growing season because of the unusual vegetation just within and without the limits of the ring. An ecological study of the disturbances caused by the mycelium of these mushrooms is now under way and will be reported upon after observations have been made during another season.

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